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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

FEGGINS, KRISTAL J

ART UNIT	PAPER NUMBER
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2861

DATE MAILED: 07/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/438,786

Applicant(s)

HARA ET AL.

Examiner

K. Feggins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 17 April 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 34-39, 49 and 50 is/are allowed.
- 6) ☒ Claim(s) 24-33 and 40-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☒ Interview Summary (PTO-413) Paper No(s). 20.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 24-27, 29-31, 34-36, 40-41 & 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (6,036,299) in view of Shimazu et al. (6,409,317 B1).

Kobayashi et al. discloses the following claimed limitations:

- * an ink jet recording apparatus (see title)
- * a recording head provided with a nozzle, said recording head being operable to jet ink particles through said nozzle based on the flushing signal (col 4, lines 25-38, figs 2-5 & 8),
- * a flushing signal generating unit/flushing controlling means/ operable to generate a flushing signal (figs 2-5 & 8) (col 4, lines 25-38, col 5, lines 42-67, col 6, lines 1-20).
- * wherein the flushing signal generating unit is operable to generate the flushing signal as a periodic signal (col 11-col 12, lines 1-31, figs 5, 8a-8g, 9 & 17a-b)
- * the periodic signal having periodic pulses (figs 8a-8g)

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* wherein each of the pulses has a trapezoidal waveform having a first inclined section, a potential maintaining section continuous with the first inclined section and a second inclined section continuous with the potential maintaining section_{3, 8} (col 11-col 12, lines 1--31, figs 8a-8g)

* wherein each of the periodic pulses has the trapezoidal waveform, and wherein a gradient of the first inclined section is greater than a gradient of the second inclined section (figs 8a-8f)

* further comprising a capping device operable to seal said nozzle of the recording head, wherein said capping device catches the ink particles jetted by said recording head through the nozzle based on the flushing signal (col 4, lines 25-38, figs 3 & 10-14)

* a member having an opening opposite to which said nozzles of said recording head can be disposed (fig 14)

* an ink absorbing member/waste ink tank/ disposed on the side of a bottom part of the opening (see fig 14)

* wherein the ink particles jetted by said recording head through said nozzle based on the flushing signal are caught by/contained by/ said ink absorbing member/waste tank/ (fig 14).

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* wherein the flushing signal generating unit is operable to generate the flushing signal separate from a printing signal based on printing data (figs 2-4).

Kobayashi et al. does not discloses the following claimed limitations:

* recording head to jet only main ink particles through the nozzle so as not to form a mist

* said recording head to jet only ink particles with a momentum greater than a predetermined value/time through said nozzle so as to not to form a mist

Shimazu et al disclose the following claimed limitations :

recording head to jet only main ink particles through the nozzle so as not to form a mist (figs 1E-F, 5E-F, 7E-F, 8E-F & 10E-F) for the purpose of satellite reduction of discharge liquid droplets.

* said recording head to jet only ink particles with a momentum greater than a predetermined value/time through said nozzle so as to not to form a mist (figs 1E-F, 5 E-F, 7 E-F, 8 E-F & 10E-F) for the purpose of eliminating the presence of satellite droplets and the fluctuation of mensicus

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a recording head to jet only main ink particles through the nozzle so as not to form a mist and a recording head to jet only ink particles with a momentum greater than a predetermined value/time through said nozzle so as to not to form a mist, taught by Shimazu et al. into Kobayashi et al. for the purposes of

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satellite reduction of discharge liquid droplets and eliminating the presence of satellite droplets and the fluctuation of meniscus.

3. Claims 28, 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (6,036,299) as modified by Shimazu et al. (US 6,409,317 B1) as applied to claims 24 & 29 above, and further in view of Raman et al. (4,730,197).

Kobayashi et al. as modified by Shimazu et al. discloses the following claimed limitation:

* wherein there is a duration of each of the pulses, a gradient of the first inclined section, a level of the potential maintaining section, and a gradient of the second inclined section (col 11, lines 66-67, col 12, lines 1-26, figs 8a-8f).

* wherein the flashing/flushing signal is periodic signal (figs 8a-8g & 9)

* wherein the periodic signal has periodic pulses, and each of the pulses has a trapezoidal waveform having a first inclined section, a potential maintaining section continuous with the first inclined section and a second inclined section continuous with the potential maintaining section (figs 8a-8g)

* wherein the flashing signal has a frequency (figs 8a-8f, see MPEP 2144.03)

* wherein the predetermined distance/fixed interval from the nozzle (col 4, lines 25-38)

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Kobayashi et al. as modified by Shimazu et al. does not disclose the following claimed limitation:

* wherein said flushing signal generating unit is operable to generate each of the periodic pulses with a duration of $25\mu\text{s}$, the first inclined section with a gradient of $10\text{V}/\mu\text{s}$, the potential maintaining section with a level of 20V, and the second inclined section with a gradient of $9.6\text{V}/\mu\text{s}$

* wherein said recording head is operable to jet the ink particles through said nozzle at a speed of 5m/s or above

* wherein said recording head is operable to jet ink particles through said nozzle at a speed of 4m/s or above, and each of the ink jet particles has a weight of 10ng or above

However, since it has been held that discovering an optimum value of a result effective variable and that discovering the optimum or workable ranges involves only routine skill in the art, *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and *In re Aller*, 105 USPQ 233, respectively. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a duration of each of the pulses is $25\mu\text{s}$, a gradient of the first inclined section is $10\text{V}/\mu\text{s}$, a level of the potential maintaining section is 20V, and a gradient of the second inclined section is $9.6\text{V}/\mu\text{s}$ for the purpose of being capable of reliably overcoming faulty printing immediately after the cleaning operation.

Furthermore, Raman et al. disclose the following claimed limitations:

* wherein said recording head is operable to jet the ink particles through said nozzle at a speed of 5m/s or above/at least 2m/s/ (col 7, lines 59-60) for the purpose of achieving a sufficient velocity to the droplet of ink at the nozzle in order for it to travel to the printing surface.

* wherein said recording head is operable to the jet ink particles through said nozzle at a speed of 4m/s or above, and each of the ink jet particles has a weight/fluid density, mass of substance per volume/ of 10ng or above. (col 7, lines 59-60, col 15, lines 26-35) for the purpose of achieving a sufficient velocity to the droplet of ink at the nozzle in order for it to travel to the printing surface.

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a recording head wherein the recording head is operable to jet the ink particles through said nozzle at a speed of 2m/s or above; a recording head that is operable to the jet ink particles through said nozzle at a speed of 4m/s or above, and each of the ink jet particles has a weight/fluid density, mass of substance per volume/ of 10ng or above, taught by Raman et al. into Kobayashi et al. as modified by Shimazu et al. for the purpose of providing an improved ink jet which produces optimal operating and fluidic parameter and for the purpose of achieving a sufficient velocity to the droplet of ink at the nozzle in order for it to travel to the printing surface.

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4. Claims 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (6,036,299) as modified by Shimazu et al. (US 6,409,317 B1) in view of Barrett et al. (5,682,191).

Kobayashi et al. as modified by Shimazu discloses the following claimed limitations:

- * a fan controller operable to stop said fan during a flushing operation in which said recording head jets ink particles through said nozzle (col 6, lines 18-20, figs 4-5).

- * an ink absorbing member operable to absorb the ink particles jetted by said recording head through said nozzle based on the flushing signal, wherein said fan controller keeps said fan stopped at least until the ink particles jetted by said recording head through said nozzle based on the flushing signal arrive at or are caught by the ink absorbing member (col 6, lines 18-20, figs 4-5),

Kobayashi et al. as modified by Shimazu et al. does not discloses the following claimed limitations:

- * a fan operable to prevent a temperature rise of said ink jet recording apparatus

Barrett et al. discloses the following claimed limitations:

- * a fan operable to prevent a temperature rise/cool fan module/ of said ink jet recording apparatus (col 3, lines 40-47, fig 1)

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a fan for preventing a temperature rise of the recording apparatus, taught by Barrett et al. into Kobayashi et al. as modified by

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Shimazu et al. for the purpose of providing a cooling module within the recording apparatus.

5. Claims 42-43 & 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (6,036,299) as modified by Shimazu et al. (US 6,409,317 B1) in view of Nakahara (6,042,218).

Kobayashi et al. as modified by Shimazu et al. disclose all of the claimed limitations except for the following:

- * wherein said recording head is provided with a plurality of nozzles respectively for different inks, and said flushing signal generating unit is operable to generate different flushing signals for said plurality of nozzles for jetting the different inks, respectively.

- * a plurality of flushing regions, wherein said recording head is provided with a plurality of nozzles respectively for different inks, and said recording head is operable to jet ink particles of the different inks through said plurality of nozzles to be caught in said plurality of flushing regions, respectively

Nakahara discloses the following claimed limitations:

- * wherein said recording head is provided with a plurality of nozzles respectively for different inks, and said flushing signal generating unit is operable to generate different flushing signals for said plurality of nozzles for jetting the different inks, respectively. (col 2, lines 66-67, col 3-col 6, lines 4-10, 20-56, figs 2-4) for the purpose

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of providing an ink jet printer able to perform flushing with a reduction in unnecessary consumption of ink.

* a plurality of flushing regions, wherein said recording head is provided with a plurality of nozzles respectively for different inks, and said recording head is operable to jet ink particles of the different inks through said plurality of nozzles to be caught in said plurality of flushing regions, respectively (col 3, line 11-col 5, line 50, col 6, lines 4-10, 20-56, figs 1-4) for the purpose of reducing unnecessary ink consumption.

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a recording head provided with a plurality of nozzles respectively for different inks, a flushing signal generating unit operable to generate different flushing signals for the plurality of nozzles for jetting the different inks, a plurality of flushing regions, and is operable to jet ink particles of the different inks through said plurality of nozzles to be caught in said plurality of flushing regions, as taught by Nakahara into Kobayashi et al. as modified by Shimazu et al. for the purpose of providing an ink jet printer able to perform flushing with a reduction in and reducing the unnecessary consumption of ink.

Allowable Subject Matter

6. Claims 34-39 & 49-50 are allowed.

The following is an examiner's statement of reasons for allowance: The primary reason for the allowance of claims 34-39 & 49-50 is the inclusion of the limitations of an ink jet recording apparatus that includes the minute ink jet particles of a previous set

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combine with the main ink jet particle of a following set in a range of a predetermined distance from said nozzle so that an amount of the minute ink jet particles scattered in mist can be reduced. It is this limitation found in the claim, as they are claimed in the combination of that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

7. Applicant's arguments with respect to claims 2433 & 40-48 have been considered but are moot in view of the new ground(s) of rejection.

In response to Applicant's argument that a flushing signal that causes a recording head to jet only main ink particles through a nozzle so as to not form a mist is noted. However, please see the above action with regards to Kobayashi et al. ('299) in view of Shimazu et al. and Kobayashi et al. as modified by. Kobayashi et al. disclose flushing control means for driving the print head wherein the flushing is timed. Shimazu et al. discloses liquid discharge wherein the satellite droplet is caught into the discharged liquid droplet thereby reducing the number of satellite droplets (col 24, lines 15-48). It would be obvious to one skilled in the art to modified Kobayashi et al. with the teaching of Shimazu et al. (cited in action) for the purposes of reducing satellites

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droplets by controlling the formation process of each discharge liquid droplet and substantially eliminating the satellites in the discharge operation.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Communication With The USPTO


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Feggins whose telephone number is 703-306-4548. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, J. Barlow can be reached on 703-308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

KF

June 29, 2002


John Barlow
Supervisory Patent Examiner
Technology Center 2800